Research report on OTKA K 108992 Grant

Rarity, life-history traits and climatic response
of endangered Hungarian vascular plants

Principal Investigator:

Molnár V., Attila (Debrecen, Hungary)

Researchers involved:

Bauer Norbert (Budapest, Hungary): BN
Bartha László (Kolozsvár, Románia): BL
Lukács Balázs A. (Debrecen, Hungary): LBA
Nótári Krisztina (Debrecen, Hungary): NK
Somlyay Lajos (Budapest, Hungary): SL
Sonkoly Judit (Debrecen, Hungary): SJ
Sramkó Gábor (Debrecen, Hungary): SG
Szatmári Lajos (Debrecen, Hungary): SZL
Takács Attila (Debrecen, Hungary): TA
Tökölyi Jácint (Debrecen, Hungary): TJ

Students involved:

Fekete Réka: FR
Laczkó Levente: LL
Ljubka Tibor: LT
Lovas-Kiss Ádám: LKÁ
Löki Viktor: LV
Malkócs Tamás: MT
Nagy Timea: NT
Süveges Kristóf: SK

Herbarium database building

The digitizing of herbarium material of the taxa studied in case of 10 herbaria [DE, B, BRA, SAS, EGR, BPU, BP, CL, W, PRC was achieved. Altogether more than 135 thousand photographs were made, this sum is two times more than previously estimated. Primary data of 95 thousand herbarium sheets were recorded in MS Excel spreadsheets, including phenological characterisation exactly dated specimens and georeferencing. Contributing researchers: NK, TA, MVA, BN & SL, students: LKÁ, SK, LV, LT.

Field work and laboratory analyses

Altogether 992 soil samples were collected and analysed in relation to more than 1400 species. Contributing researchers: MVA, TA, LBA, SL & BN; students: LKÁ, SK & EVA. Plant functional trait samples of 453 species were collected from 177 georeferenced localities throughout the country. Usually 5 (rarely 10) leaves were gathered in a certain locality. Area (cm^2), fresh mass (g) and dry mass (g) of leaves were measured. From these measured data specific leaf area (SLA)

(m^2/kg) and leaf dry mater content (mg/g) were calculated. Contributing researchers: MVA, TA, LBA (field sampling, measurements), contributing students: EVA, SK, LKÁ.

DNA-sampling and analyses

Plant tissue samples of 691 species were collected. Genomic DNA was extracted from 574 species, and nrITS region were successfully amplified and sequenced from samples of 504 species.Contributing researchers: MVA, SG, TA, LBA, BN & SL (field sampling); SG, TA (lab work), students: LKÁ, SK, LV (field sampling), MT, LL (lab work).

Publications

During the whole period of the project altogether 100 items were published, including:
52 peer reviewed papers in international journals (cumulative impact factor: 104,7)
28 papers in Hungarian peer reviewed journals (22 in Hungarian)
16 popular scientific articles
4 books (in Hungarian)

Thematically connected to our herbarium database building, we published basic dataset of Siroki Herbarium [H15], Soó Herbarium of University Debrecen [H7], Herbarium of Eötvös University [H25] and Eszterházy University [H1].
We published a review paper [H5] in Hungarian (with English summary) on 'the new type' utilizations of herbaria, based on data of 86 scientific publications. In the official journal of the Hungarian Academy of Sciences ('Magyar Tudomány') a review was published on the role of herbaria in studying recent anthropogenic climate change [H3]. Three popular scientific paper in Hungarian were also published [PS-9], [PS-13], [PS-14]. Long-term herbarium dataset was used to quantify the reproduction rate of Hungarian orchids [IP-5] between 1853 and 2008. We quantified fruit-set rate of 663 specimens belonging to 27 species. Herbarium data were validated with field-observed data in case of the different pollination strategies. According to our results, the reproductive success of the vast majority of orchid species has not changed during time and pollination crisis is not apparent in Hungary at least until the end of the 20th century.
A new series aimed to contribute with new data to the distribution maps published in Distribution atlas of vascular plants of Hungary (Bartha et al. 2015) was established. In 2016 two papers [31, 35] were published with distribution data of 612 taxa from 283 flora mapping grids, and 297 data from 247 flora mapping grids.
Associated with our plant functional trait studies, two papers were published: a significant contribution to the knowledge of thousand-seed weights of Hungarian flora [H8] [H22]. A review on the specific variability and ecological significance of seed weights [H4] and a paper on the the seed mass – distribution range trade-off hypothesis [IP-30] were also published. Our collected plant trait data were

corporated into the TRY, an open access and comprehensive, global database [IP-51]. We used also several plant traits to quantifying the effect of gut passage by waterbirds on the seed coat and pericarp of diaspores [IP-52] [IP-46]. Based on our leaf-trait studies a paper was recently accepted for publication [IP-44]. We also documented the significance of growth form driving the functional difference of native and alien aquatic plants [IP-28].

Papers on the molecular phylogeny and evo lutionary history of the endangered orchid genus *Himantoglossum* was published [IP-1]. We documented road-side verges as important habitats for Himantoglossum orchids [IP-27]. Habitat preferences [IP-37], assessment of the reproductive success [IP-8] of the rare Adriatic Lizard-Orchid (*Himantoglossum adriaticum*) was published, as well as the review of its biology [IP-47].

We used phylogenetic controll (with help of the nrITS sequences generated with support of this OTKA grant) in quantifying reproductive success of autogamous, deceptive and nectar-rewarding orchids [IP-19]. Our results indicate that deceptive orchids can compensate for their lower fruit set by having more (but not larger) seeds in a fruit than rewarding species. These findings highlight possible ways in which plants can increase their reproductive success in face of pollinator limitation. We emphasize that fruit set in itself is an inappropriate measure of the reproductive success of orchids – the total number of seeds per shoot is a much better approximation. Assesment of the reproduction success of Hungarian populations of two deceptive and a nectar-rewarding orchid species was also published [IP-5].

We examined the variation of seed and vegetative characters in nine *Elatine* species [IP-12] to reveal the extension of plasticity induced by the amphibious environment, and to test character reliability for species identification. The results clearly indicated that only seed traits are stable within species (i.e., different forms of the same species keep similar morphology). In frame of an international collaboration [IP-9] we published chromosome numbers for 13 taxa of *Elatine* L., including all 11 species occurring in Europe, originating from 17, field-collected populations. For seven of them the chromosome numbers are reported for the first time.

We studied long-term survival of herbarium-stored seeds of the rare *Astragalus contortuplicatus* [IP-3]. The oldest seeds that germinated were 131 years old. Until now there are no records of seeds of herbaceous legumes germinating that are more than 100 years old. This record is the 9th oldest of all the literature records of viable seeds originating from biological collections. Our results suggest that seeds of *A. contortuplicatus* stored in collections can be successfully used in this species' reintroduction for conservation purpose, to areas in which the plants were collected.

Several experimental studies have shown that many widespread wetland plant species can be readily dispersed within the guts of ducks and their relatives. However, it is unclear whether plants with a more restricted distribution are able to disperse via waterbirds. Our paper [IP-10] addresses the dispersal ability and germination ecology of the little-known and rare Hungarian milkvetch *Astragalus*

contortuplicatus, which occurs on banks of continental rivers and has a limited and unpredictable distribution. To test whether limited capacity for endozoochory by waterfowl could explain the sporadic appearance of this species, we force-fed captive mallards (*Anas platyrhynchos*) with 100 milkvetch seeds each. Intact and viable seeds were found in the droppings of each mallard, and altogether 24.7% of seeds fed were recovered intact. Our results suggest that avian vectors may be more important for the dispersal of rare higher plants (especially those with a hard seed-coat) than hitherto considered.
Additonally, a book on the life and heritage of famous Hungarian botanist, Pál Kitaibel (1757–1817) [B3], and an another book on the wildlife of cemeteries [B4], and 16 popular scientific articles [P1–P16.] were published.

Papers published or accepted with support of OTKA K 108992 Grant
(Boldface indicates the participants of research project)

Peer reviewed papers published international journals:

[IP-1] **Sramkó G.**, **Molnár V. A.**, Hawkins J., Bateman R.M.: Molecular phylogeny and evolutionary history of the Eurasiatic orchid genus Himantoglossum s.l. (Orchidaceae). Annals of Botany 114(8): 1609–1626., 2014 IF: 3.295

[IP-2] **Löki V., Tökölyi J., Süveges K., Lovas-Kiss Á.**, Hürkan K., **Sramkó G.** & **Molnár V. A.** (2015): The orchid flora of Turkish graveyards: a comprehensive field survey. Willdenowia 45(2): 231–244. IF: 0.721

[IP-3] **Molnár V. A.**, Sonkoly J., **Lovas-Kiss Á., Fekete R., Takács A., Somlyay L.** & Török P. (2015): Seed of the threatened annual legume, Astragalus contortuplicatus, can survive over 130 years of dry storage. Preslia 87: 319–328, IF: 2.711

[IP-4] **Somlyay L.**, & Sennikov A. N. (2015): Atlas Florae Europaeae notes 24. Taxonomic interpretation and typification of Sorbus pannonica (Rosaceae), a presumed intermediate between S. aria and S. graeca from Hung, Botanici Fennici 52(3-4): 274–287., 2015 IF: 0.698

[IP-5] **E. Vojtkó A.**, Sonkoly J., **Lukács B. A.** & **Molnár V. A.** (2015): Factors affecting reproductive success in three entomophilous orchid species in Hungary., Acta Biologica Hungarica 66(2): 231–241., IF: 0.589

[IP-6] **Molnár V. A.**, **Löki V., Takács A.**, Schmidt J., **Tökölyi J.**, Bódis J. & **Sramkó G.** (2015): No evidence for historical declines in pollination success in Hungarian orchids. Applied Ecology and Environmental Research *13*, 1097–1108., IF: 0.557

[IP-7] Popiela A., Łysko A., **Molnár V. A.**, Kącki Z. & **Lukács B. A.** (2015): Elatine triandra Schkuhr (Elatinaceae) in Europe, with special emphasis on the central part of the continent. Acta Botanica Gallica – Botany Letters 162(4): 325–337., DOI 10.1080/12538078.2015.1088470, 2015 IF: 0.479

[IP-8] Biró É., Bódis J., **Nagy T.**, Tökölyi J. & **Molnár V. A.** (2015): Honeybee (Apis mellifera) mediated increased reproductive success of a rare

deceptive orchid., Applied Ecology and Environmental Research 13(1): 181–192., 2015 IF: 0.456

[IP-9] Kalinka A., **Sramkó G.**, Horváth O., **Molnár V. A.** & Popiela A. (2015): Chromosome numbers of selected species of Elatine L. (Elatinaceae)., Acta Societatis Botanicorum Poloniae 84(4): 413–417., 2015 IF: 1.174

[IP-10] **Lovas-Kiss A.**, Sonkoly J., Vincze O., Green A. J., **Takács A.** & **Molnár V. A.** (2015): Strong potential for endozoochory by waterfowl in a rare, ephemeral wetland plant species (Astragalus contortuplicatus, Fabaceae). Acta Societatis Botanicorum Poloniae 84(3): 321–326., IF: 1.174

[IP-11] Bateman R. M., **Sramkó G.** & Rudall P. J. (2015): Floral miniaturisation and autogamy in boreal-arctic plants are epitomised by Iceland's most frequent orchid, Platanthera hyperborea., PeerJ 3: e894., 2015 IF: 2.100

[IP-12] **Molnár V. A.**, Tóth J. P., Sramkó G., Horváth O., Popiela A., Mesterházy A., **Lukács B. A.** (2015): Flood induced phenotypic plasticity in amphibious genus Elatine (Elatinaceae)., PeerJ 3:e1473, 2015 IF: 2.100

[IP-13] **Somlyay L.** & Sennikov A.N. (2016): Atlas Florae Europaeae notes 25. Taxonomic circumscription and nomenclature of Sorbus danubialis (Rosaceae)., Nordic Journal of Botany 34: 75–86., 2016 IF: 0.921

[IP-14] **Somlyay L.**, Lisztes-Szabó Zs. & Sennikov A.N. (2016): Atlas Florae Europaeae notes 28. Disentangling the taxonomic circumscription of Sorbus subdanubialis (Rosaceae)., Somlyay L., Lisztes-Szabó Zs. & Sennikov A.N. (2016): Atlas Florae Europaeae notes 28. Disentangling the taxonomic circumscription of Sorbus subdanubialis (Rosaceae). Ann. Bot. Fennici 53:345–361., IF: 0.893

[IP-15] **Somlyay L.**, Lisztes-Szabó Zs. & Sennikov A.N. (2016): Atlas Florae Europaeae notes 29. Two new species of Sorbus (Rosaceae) endemic to Hungary, previously confused with S. subdanubialis., Annales Botanici Fennici 53: 361–372., 2016 IF: 0.893

[IP-16] **Molnár V. A.** & **Löki V.** (2016): Cochlearia danica (Lapierre) DC., In: Raab-Straube E. von & Raus Th. (ed.): Euro+Med-Checklist Notulae, 6. Willdenowia 46: 423–442., 2016 IF: 0.500

[IP-17] **Takács A.** & **Molnár V. A.** (2016): Elatine hexandra (Lapierre) DC., . In: Raab-Straube E. von & Raus Th. (ed.): Euro+Med-Checklist Notulae, 6. Willdenowia 46: 423–442., 2016 IF: 0.500

[IP-18] **Lukács B. A.**, Mesterházy A., Vidéki R., & Király G. (2016): Alien aquatic vascular plants in Hungary (Pannonian ecoregion): Historical aspects, data set and trends., Plant Biosystems 150(3): 388-395. IF: 1.360

[IP-19] **Sonkoly J.**, **E. Vojtkó A.**, **Tökölyi J.**, Török P., **Sramkó G.**, Illyés Z., **Molnár V. A.** (2016): Higher seed number compensates for lower fruit-set in deceptive orchids., Journal of Ecology 104: 343–351. DOI 10.1111/1365-2745.12511, 2016 IF: 6.180

[IP-20] **Sramkó G.**, **Molnár V. A.**, Tóth J. P., **Laczkó L.**, Kalinka A., Horváth O., Skuza L., **Lukács B. A.** & Popiela A. (2016): Molecular phylogenetics, seed morphometrics, chromosome number evolution and systematics of European Elatine L. (Elatinaceae) species., PeerJ 4: e2800, 2016 IF: 2.100

[IP-21] Mosolygó-L. Á. **Sramkó G.**, Barabás S., Czeglédi L., Jávor A., **Molnár V. A.**, Surányi Gy. (2016): Molecular genetic evidence for allotetraploid hybrid speciation in the genus Crocus L. (Iridaceae)., Phytotaxa 258(2): 121–136., 2016 IF: 1.087

[IP-22] Szczecińska M., **Sramkó G.**, Wołosz K., & Sawicki J. (2016): Genetic Diversity and Population Structure of the Rare and Endangered Plant Species Pulsatilla patens (L.) Mill in East Central Europe., Plos One 11(3): e0151730., 2016 IF: 3.057

[IP-23] **Molnár V.A.**, **Süveges K.**, Molnár Zs., **Löki V.** (2017): Using traditional ecological knowledge in discovery of rare plants., Acta Societatis Botanicorum Poloniae 86(3): 3541., 2017 IF: 0.917

[IP-24] **Fekete R.**, **Nagy T.**, Bódis J., Biró É., **Löki V., Süveges, K., Takács A., Tökölyi J.**, **Molnár V. A.** (2017): Roadside verges as habitats of rare lizard-orchids (Himantoglossum spp.): ecological traps or refuges?, Science of the Total Environment 607–608: 1001–1008., 2017 IF: 4.900

[IP-25] **Molnár V. A.**, **Löki V.**, Máté A., Molnár A., **Takács A.**, **Nagy T.**, **Lovas-Kiss Á., Lukács B.A., Sramkó G. & Tökölyi J.** (2017): The occurrence of Spiraea crenata and other rare steppe plants in Pannonian graveyards, Biologia 72(5): 500–509., 2017 IF: 0.719

[IP-26] **Takács A.**, **Molnár V. A.**, Horváth O., **Sramkó G.**, Popiela A., Mesterházy A., **Lovas-Kiss Á.**, Green A. J., **Löki V.**, **Nagy T.**, **Lukács, B. A.** (2017): The rare aquatic angiosperm Elatine gussonei (Elatinaceae) is more widely distributed than previously thought. Aquatic Botany 141: 47–50., 2017 IF: 1.714

[IP-27] **Molnár V. A.**, **Takács A.**, Mizsei E., **Löki V.**, Barina Z., **Sramkó G. & Tökölyi J.** (2017): Religious differences affect orchid diversity of Albanian graveyards., Pakistan Journal of Botany 49(1): 289–303., 2017 IF: 0.658

[IP-28] **Lukács B. A., E. Vojtkó A.**, Mesterházy A., **Molnár V. A.**, Süveges K., Végvári Zs., Brusa G., Cerabolini B. E.L. (2017): Growth-form and spatiality driving the functional difference of native and alien aquatic plants in Europe., Ecology and Evolution 7: 950–963., IF: 2.537

[IP-29] **Molnár V. A.**, **Nagy T.**, **Löki V., Süveges K., Takács A.**, Bódis J. & **Tökölyi J.** (2017): Turkish graveyards as refuges for orchids against tuber harvest, Ecology and Evolution 7: 11257–11264., IF: 2.440

[IP-30] **Sonkoly J.**, Deák B., Valkó O., **Molnár V. A.**, Tóthmérész B. & Török P. (2017): Do large-seeded herbs have a small range size? The seed mass – distribution range trade-off hypothesis. Ecology and Evolution 7: 11204–11212., IF: 2.440

[IP-31] Bateman R. M., **Molnár V. A.**, **Sramkó G.** (2017): Morphometric survey elucidates the evolutionary systematics of the Eurasian Himantoglossum clade (Orchidaceae: Orchidinae)., PeerJ 5: e2893, IF: 2.1

[IP-32] Popiela A., Łysko A., Białecka B., Bihun M., **Sramkó G.**, Staroń W., Wieczorek A. & **Molnár V. A.** (2017): Seed morphometric characteristics of European species of Elatine (Elatinaceae)., PeerJ 5: e3399., IF: 2.1

[IP-33] **Molnár V. A.**, Mészáros A., Csathó A.I., Balogh G., Csősz S. (2018): Ant species dispersing the seeds of the myrmecochorous Sternbergia colchiciflora (Amaryllidaceae)., North-Western Journal of Zoology 14(2): 265-267., IF: 0.539

[IP-34] **Lovas-Kiss Á.**, Vizi B., Vincze O., **Molnár V. A.** & Green A. J. (2018): Endozoochory of aquatic ferns and angiosperms by mallards in central Europe., Journal of Ecology 106(4): 1714-1723., 2018 IF: 5.521

[IP-35] Nobis M., Domina G., Meço M., Mullaj A., Bazan G., Ebel A. L., Király G., Erst A., Nowak A., Sukhorukov A. P., Pospelova E. B., Pospelov I. N., Vasjukov V. M., Piwowarczyk R., Seregin A. P., Király A., Kushunina M., Liu B., **Molnár V. A.**, Olonova M., Óvári M., Paszko B., You-Sheng Ch., Verkhozina A. V., Zykova E. Y., Klichowska E., Nobis A., Wróbel A., Aydın Z. U., Dönmez A. A., Garakhani P., Koopman J., Korolyuk A., Oklejewicz K., Qasimova T., Wang W., Więcław H., Wolanin M. & Xiang K. (2018): Contribution to the flora of Asian and European countries: new national and regional vascular plant records, 7., Botany Letters 165: 200–222., 2018 IF: 1.342

[IP-36] **Lovas-Kiss, Á.**, Sánchez, M.I., **Molnár V. A.**, Valls, L., Armengol, X., Mesquita-Joanes, F. & Green, A.J. (2019):Crayfish invasion facilitates dispersal of plants and invertebrates by gulls. Freshwater Biology 63(4): 392-404, 2018 IF: 3.255

[IP-37] Bódis J., Biró É., **Nagy T., Takács A.**, **Molnár V. A.** & **Lukács B. A.** (2019): Habitat preferences of the rare lizard-orchid Himantoglossum adriaticum H. Baumann., Tuexenia 38: 329–345., 2018 IF: 1.125

[IP-38] **Molnár V. A.**, Mészáros A., Csathó A. I., Balogh G., **Takács A., Löki V., Lovas-Kiss Á., Tökölyi J., Somlyay L. & Bauer N.** (2019): Distribution and seed production of the rare, dry grassland specialist Sternbergia colchiciflora (Amaryllidaceae) in Pannonian cemeteries. Tuexenia 38: 371–384., 2018 IF: 1.125

[IP-39] **Takács A, Molnár V. A, Lukács BA, Nagy T, Lovas-Kiss Á**, Green AJ, Popiela A, Somlyay L. (2019): Resurrection and typification of Elatine campylosperma (Elatinaceae), a long-forgotten waterwort species., PeerJ 6:e4913, 2018 IF: 2.100

[IP-40] **Fekete R.**, Mesterházy A., Valkó O. & **Molnár V. A.**: A hitchhiker from the beach - The spread of a maritime halophyte (Cochlearia danica L.) along salted continental roads., Preslia 90: 23–37, 2018 IF: 3.000

[IP-41] **Lukács B.A.**, **E.-Vojtkó A.**, Erős T., **Molnár V. A.**, Szabó S. & Götzenberger L.: Carbon forms, nutrients and water velocity filter hydrophyte and river-bank species differently: A trait-based study., Journal of Vegetation Science https://doi.org/10.1111/jvs.12738, 2019 IF: 2.944

[IP-42] **Laczkó L., Lukács B. A.**, Mesterházy A., **Molnár V. A.**, **Sramkó G.** (2019): Is Nymphaea lotus var. thermalis a Tertiary relict in Europe?, Aquatic Botany 155: 1–4. Doi 10.1016/j.aquabot.2019.02.002, 2019 IF: 1.787

[IP-43] **Löki V.**, Deák B., **Lukács B. A.** & **Molnár V. A.** (2019): Biodiversity potential of burial places – a review on the flora and fauna of cemeteries

and churchyards., Global Ecology and Conservation 18: e00614. DOI 10.1016/j.gecco.2019.e00614, 2019 IF: 2.751

[IP-44] **E-Vojtkó A.**, Balogh N., Deák B., Kelemen A., Kis Sz., Kiss R., **Lovas-Kiss Á., Löki V.**, Lukács K., **Molnár V. A., Nagy T.**, Sonkoly J., **Süveges K., Takács A.**, Tóth E., Tóth K., Tóthmérész B., Török P., Valkó O., Vojtkó A. & **Lukács B. A.** (2020): Leaf trait records of vascular plant species in the Pannonian flora with special focus on endemics and rarities., Folia Geobotanica (accepted for publication), 2019 IF: 1.571

[IP-45] **Fekete, R., Löki, V.,** Urgyán, R., **Süveges, K., Lovas-Kiss, Á.,** Vincze, O., **& Molnár V, A.** (2019): Roadside verges and cemeteries: Comparative analysis of anthropogenic orchid habitats in the Eastern Mediterranean., Ecology and Evolution 9: 6655–6664., 2019 IF: 2.537

[IP-46] **Lovas-Kiss Á.**, Vincze O., Kleyheg E., **Sramkó G., Laczkó L., Fekete R.**, **Molnár V. A.**, Green A. J. (2019): Seed mass, hardness and phylogeny determine the potential for endozoochory by granivorous waterbirds., Ecology and Evolution (accepted for publication), 2019 IF: 2.537

[IP-47] Bódis J., Biró É., **Nagy T., Takács A., Sramkó G.**, Bateman R. M., Gilián L. Illyés Z., **Tökölyi J., Lukács B. A.**, Csábi M. & **Molnár V. A.** (2019): Biological flora of Central Europe Himantoglossum adriaticum H. Baumann., Perspectives in Plant Ecology, Evolution and Systematics 40: 125461. DOI 10.1016/j.ppees.2019.125461, 2019 IF: 2.524

[IP-48] **Nagy T.**, Pfliegler W., Takács A., Tökölyi J. & **Molnár V. A.** (2019): Distribution, infection rates and DNA-barcoding of Uromyces erythronii (Pucciniaceae), a parasite of Erythronium (Liliaceae) in Europe., Willdenowia 49(1): 13-20, 2019 IF: 1.500

[IP-49] **Süveges K., Löki V., Lovas-Kiss Á., Ljubka T., Fekete R., Takács A.,** Vincze O., **Lukács B. A., Molnár V. A.** (2019): From European priority species to characteristic apophyte: Epipactis tallosii (Orchidaceae)., Willdenowia 49(3): 401–409. DOI: 10.3372/wi.49.49310, 2019 IF: 1.500

[IP-50] Nobis M., Klichowska E., Terlević A…. **Molnár V. A.** … Zykova E. (2019): Contribution to the flora of Asian and European countries: new national and regional vascular plant records, 8., Botany Letters DOI: 10.1080/23818107.2019.1600165, 2019 IF: 1.342

[IP-51] Kattge J., Bönisch G., Díaz S., Lavorel S., Prentice I. C., Leadley, Tautenhahn S., Werner G., … **Lukács B. A.**, …. **Molnár V. A.** … & Wirth C.: (2020): TRY plant trait database - enhanced coverage and open access., – Global Change Biology (accepted for publication), 2020 IF: 8.880

[IP-52] Costea M., **Laczkó L., Fekete R., Molnár V. A. Lovas-Kiss Á.**, Green A. J. (2020):The effect of gut passage by waterbirds on the seed coat and pericarp of diaspores lacking "external flesh": evidence for widespread adaptation to endozoochory in angiosperms., PLoS One (accepted for publication), 2020 IF: 2.776

Papers published in Hungarian journals:

[H1] **E. Vojtkó A., Takács A.**, **Molnár V. A.** & Vojtkó A. (2014): Herbarium database of the vascular collection of Eszterházy Károly College (EGR)., Kitaibelia 19(2) 339–348.
[H2] **Ljubka T., Lovas-Kiss Á., Takács A.**, **Molnár V. A.** (2014): Epipactis albensis Nováková and Rydlo (Orchidaceae) in Ukraine – new data on occurrence and ecology., Acta Botanica Hungarica 56(3–4): 399–408.
[H3] **Molnár V. A.**: A herbáriumok jelentősége a klímaváltozás kutatásában., Magyar Tudomány 175(4): 467–473.
[H4] Sonkoly J., **Molnár V. A.**, Török P. (2014): A növényi magtömeg-variabilitás ökológiai háttere és jelentősége. Specific variability and ecological meaning of seed weights., Kitaibelia 19(2): 295–330.
[H5] **Takács A., Laczkó L.**, **Molnár V. A.** (2014): A herbáriumok „új típusú" felhasználásai. New applications of herbaria., Botanikai Közlemények 100: 217–238.
[H6] **Takács A.** & **Molnár V. A.** (2014): Az év vadvirága 2013-ban: A nyári tőzike (Leucojum aestivum L.). Kitaibelia 19(2): 354–364.
[H7] **Takács A., Nagy T., Fekete R., Lovas-Kiss Á., Ljubka T., Löki V.**, Lisztes-Szabó Zs. & **Molnár V. A.** (2014): A Debreceni Egyetem Herbáriuma (DE) I. A „Soó Rezső Herbárium". The herbarium of Debrecen University (DE) I. The "Rezső Soó Herbarium"., Kitaibelia 19(1): 124–137.
[H8] Török P., Miglécz T., Valkó O., Tóth K., Kelemen A., Albert Á., Matus G., **Molnár V. A.**, Ruprecht E., Papp L., Deák B., Horváth O., **Takács A.**, Hüse B., Tóthmérész B. (2014): New thousand-seed weight records of the Pannonian flora and their application in analysing Social Behaviour Types., Acta Botanica Hungarica 55: 429–472.
[H9] **Bauer N.** (2015): Az Apium repens (Jacq.) Lagasca új előfordulása a Szigetközben. Kitaibelia 20(2): 300. DOI 10.17542/kit.20.300
[H10] **Bauer N. & Somlyay L.** (2015): A Crepis mollis (Jacq.) Asch. subsp. hieracioides (Waldst. & Kit.) Domin újrafelfedezése Magyarországon., Kitaibelia 20(1): 150–156. DOI 10.17542/kit.20.150
[H11] **E. Vojtkó A. & Lukács B. A.** (2015): Növényi jellegek és alkalmazásuk növényökológiai kutatásokban I.: Történeti áttekintés, jelleg típusok, módszertan és adatbázisok I. Kitaibelia 20(2): 286–289. DOI:10.17542/kit.20.286
[H12] **Löki V.** & **Molnár V. A.** (2015): New localities of Elatine macropoda and E. alsinastrum in Turkey (Çanakkale)., Studia Botanica Hungarica 46(1): 43–47.
[H13] Sulyok J., Vojtkó A. & **Somlyay L.** (2015): A Viola collina Besser előfordulása a Bükkben és az Upponyi-hegységben., Kitaibelia 20(2): 254–258. DOI: 10.17542/kit.20.254
[H14] **Takács A.**, **Nagy T.**, Salamon-Albert É. & **Molnár V. A.** (2015): Az év vadvirága 2014-ben: A szibériai nőszirom (Iris sibirica L.)., Kitaibelia 20(2): 268–285. DOI 10.17542/kit.20.268

[H15] **Takács A., Süveges K., Ljubka T., Löki V.**, Lisztes-Szabó Zs. & **Molnár V. A.** (2015): A Debreceni Egyetem Herbáriuma (DE) II.: A „Siroki Zoltán Herbárium”., Kitaibelia 20(1): 15–22. DOI 10.17542/kit.20.15

[H16] Molnár A. & **Molnár V. A.**: Csalánlevél gubacsszúnyog (Dasineura urticae Perris, 1840) előfordulása kúszó csalánon (Urtica kioviensis Rogow.)., Kitaibelia 21(1): 162., 2016

[H17] Molnár Cs., Lengyel A., **Molnár V. A.**, **Nagy T.**, Csábi M., **Süveges K.**, Lengyel-Vaskor D., Tóth Gy., **Takács A.**: Pótlások a Magyarország edényes növényfajainak elterjedési atlaszához II., Kitaibelia 21(2): 227–252., 2016

[H18] **Nótári K.**, Jakab G., Pifkó D.: Az egyvirágú here (Trifolium ornithopodioides (L.) Sm.) „újrafelfedezése” a Hortobágyon, Kitaibelia 21(2): 207–212., 2016

[H19] Óvári M. & **Molnár V. A.**: A Muscari tenuiflorum Tausch előfordulása a Keszthelyi-hegységben, Kitaibelia 21(1): 162., 2016

[H20] **Somlyay L.**, Makádi S. & Csábi M. (2016): Adatok Budapest környéke flórájának ismeretéhez II., Kitaibelia 21: 33–50., 2016

[H21] **Takács A., Nagy T., Sramkó G., Lovas-Kiss Á., Süveges K., Lukács B. A., Fekete R., Löki V.**, Malatinszky Á., **E. Vojtkó A.**, Koscsó J., Pfliegler W. P., **Nótári K.**, **Molnár V. A.** (2016): Pótlások a Magyarország edényes növényfajainak elterjedési atlaszához I., Kitaibelia 21(1): 101–115.

[H22] Török P., Tóth E., Tóth K., Valkó O., Deák B., Kelbert B., Bálint P., Radócz Sz. , Kelemen A., Sonkoly J., Miglécz T., Matus G., **Takács A.**, **Molnár V. A.**, **Süveges K.**, Papp L., Papp L. jr., Tóth Z., Baktay B., Málnási Csizmadia G., Oláh I., Peti E., Schellenberger J., Szalkovszki O, Kiss R., Tóthmérész B. (2016): New measurements of thousand-seed weights of species in the Pannonian Flora., Acta Botanica Hungarica 58(1–2): 187–198.

[H23] Mesterházy A., Vidéki R., Lukács B. A., Mészáros A. & **Molnár V. A.** (2017): Adatok a színes békaszőlő (Potamogeton coloratus) hazai előfordulásához., Kitaibelia 22(1): 77–83.

[H24] **Molnár V. A.**, Csányi B., Vidéki R., Bauer N., Dolánszky F., Papp V. G., **Nótári K.**, Buczkó K., Gulyás P. & Virók V. (2017): Felföldy Lajos (1920–2016)., Kitaibelia 22(1): 3–25.

[H25] Nótári K., **Nagy T.**, Löki V., Ljubka T., **Molnár V. A.** & Takács A. (2017): Az ELTE Füvészkert herbáriuma (BPU)., Kitaibelia 22(1): 55–59.

[H26] **Süveges K.**, **Molnár V. A.**, Koscsó J. (2017): A csermelyciprus (Myricaria germanica) új hazai előfordulása., Kitaibelia 22(1): 60–63.

[H27] **Molnár V. A.** & **Löki V.** (2018): Végveszélyben: a fejfás temetők botanikai és kultúrtörténeti értékei Magyarországon és Erdélyben., Kitaibelia 23(1): 51–64.

[H28] **Nagy T.**, **Nótári K., Takács A., Malkócs T., Tökölyi J.** & **Molnár V. A.** (2018): Precipitation and timing of flowering in Ghost orchids (Epipogium aphyllum Sw.). Acta Botanica Hungarica 60(1–2): 223–230.

Popular scientific papers published (in Hungarian):

[PS-1] Biró É., Bódis J., Tökölyi J. & **Molnár V. A.** (2014): Megtévesztő stratégia. Mitől függ a sallangvirágok szaporodási sikere? – Élet és Tudomány 69(29): 912–914.

[PS-2] **Molnár V. A.** & Lukács B. A. (2014): Belvizes szántók. Átok vagy áldás? – Élet és Tudomány 69(15): 454–456.

[PS-3] E. Vojtkó A., **Molnár V. A.** & Lukács B. A. (2014): Rejtőzködő információk a növényekben. – Természet Világa 145(5): 226–228.

[PS-4] **Molnár V. A.** (2014): Orchideák, melyek lenyűgözték Darwint. – Természet Világa 145(8): 364–367.

[PS-5] **Molnár V. A.** 2015: Klímaváltozás és orchideák. – Természet Világa 146(1: 40–41.

[PS-6] Takács A. & **Molnár V. A.** 2015: Az Év Vadvirágai 2015 – A fehér szegfüvek. Istenek, szent királyok, lovagok füvei. – Élet és Tudomány 70(33: 1030–1032.

[PS-7] **Molnár V. A.**, Sonkoly J. & Takács A. 2015a: Növények Csipkerózsika-álma avagy meddig életképesek a magvak? – Élet és Tudomány 70(39: 1222–1224.

[PS-8] **Molnár V. A.**, Schmotzer A., Máté A. & Löki V. 2015b: Élet a halál után. A temetők növénytani öröksége. – Élet és Tudomány 70(45: 1424–1427.

[PS-9] Takács A., **Nagy T.** & **Molnár V. A.** 2016: Herbáriumok: porosodó szénakazlak, vagy információs aranybányák? – Interpress Magazin 36(1: 94–100.

[PS-10] Fekete R., **Nagy T.** & **Molnár V. A.** (2016): Az utak és az élővilág. – Interpress Magazin 36(1): 38–43.

[PS-11] **Molnár V. A.** & Takács A. (2016): Megporzási válság - A pollináció mint természeti szolgáltatás. – Természet Világa 147(7): 303–305.

[PS-12] **Molnár V. A.** & Takács A. (2016): Az Év vadvirága 2016-ban. A közönségkedvenc kockásliliom. – Élet és Tudomány 71(15): 464–466.

[PS-13] **Nagy T.**,Takács A., **Molnár V. A.** (2017): A herbáriumok históriája és haszna 1. A szárított kerttől a modern gyűjteményekig. – Élet és Tudomány 72(22): 687–690.

[PS-14] Takács A., **Nagy T.**, **Molnár V. A.** (2017): A herbáriumok históriája és haszna 2. Mire jók a növénygyűjtemények? – Élet és Tudomány 72(24): 752–754.

[PS-15] Fekete R. & **Molnár V. A.** (2017): Az utak hatása az élővilágra. - Természet Világa 148(6): 268-270.

[PS-16] **Molnár V. A.** (2018): Gyógynövény és enciánsnapsz., Élet és Tudomány 73(35): 1094–1096.

Books (in Hungarian):

[B1] **Molnár V. A.** (2014):Európai kosborfélék (Orchidaceae) és látonyafélék (Elatinaceae) kutatása: taxonómiai és ökológiai esettanulmányok., Debreceni Egyetem TTK Növénytani tanszék, Debrecen. ISBN: 978-963-473-722-3; DOI: 10.13140/2.1.1691.2963, 2014

[B2] Bartha D., Király G., Schmidt D., Tiborcz V., Barina Z., Csiky J., Jakab G., Lesku B., Schmotzer A., Vidéki R., Vojtkó A., Zólyomi Sz. (eds., 2015): Magyarország edényes növényfajainak elterjedési atlasza. Distribution atlas of vascular plants of Hungary., Nyugat-magyarországi Egyetem Kiadó, Sopron, 329 pp.

[B3] **Molnár V. A.** 2016: KITAIBEL. Egy magyar tudós élete. – Debreceni Egyetem TTK, Növénytani Tanszék, Debrecen. 216 pp. ISBN 978-963-473-890-9

[B4] **Molnár V. A.** (ed., 2018): Élet a halál után – A temetők élővilága. Life after death. Wildlife of cemeteries. – Debreceni Egyetem TTK Növénytani Tanszék, Debrecen. ISBN 978-963-490-047-4 m(in Hungarian, with English summaries)